

Evaluation of Fish Behavior Upstream and Downstream of the Mitten Crab Traveling Screen at the Tracy Fish Collection Facility

Investigator

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Summary

The Bureau of Reclamation has an active fish salvage improvement research program at the Tracy Fish Collection Facility (TFCF) in Byron, California. One aspect under study is the use of a traveling screen in the secondary channel to remove debris. This screen was installed in 1999 at the head of the secondary channel to screen and remove invasive Chinese mitten crabs (*Eriocheir sinensis*) from the system. The screen was highly effective at removing crabs (White *et al.* 2000) and moderately effective at removing aquatic vegetation (Boutwell and Sisneros 2007). Preliminary studies by White *et al.* (2000) found that fish were generally not detained by the screen on their way into the holding tanks. We further evaluated whether the screen reduces fish louver efficiency by using controlled release-recovery experiments with Chinook salmon (*Oncorhynchus tshawytscha*), white sturgeon (*Acipenser transmontanus*), and striped bass (*Morone saxatilis*).

Problem Statement

Aquatic vegetation and other entrained debris impacts fish salvage at the TFCF (White *et al.* 2000, Boutwell and Sisneros 2007). Studies to date found that the vertical traveling screen effectively removed mitten crabs and some aquatic plant debris coming into the secondary channel (White *et al.* 2000, Boutwell and Sisneros 2007). However, little is known of impacts of traveling screen operation on fish louver efficiency (and ultimately fish salvage).

Goals and Hypotheses

Goal:

1. Determine if operation of the vertical traveling screen reduces fish louver efficiency.

Hypothesis:

1. Louver efficiency does not change when the traveling screen is in operation.

Materials and Methods

We tested louver efficiency in the secondary channel under three conditions: (1) traveling screen in/floor ramp inclined (condition used for removal of mitten crabs), (2) traveling screen in/floor ramp flat (no gap between the bottom screen edge and the channel floor), and (3) screen and ramp out (control condition). A total of 30 fish release-recapture experiments were conducted using hatchery reared juvenile striped bass, white sturgeon, and Chinook salmon. Fish were released into the primary channel bypasses under the above conditions, and their recovery in the holding tanks determined for the following 90 minutes. Analysis of variance will be used to statistically test whether the traveling screen affects louver efficiency.

Coordination and Collaboration

This study is coordinated with the California Department of Fish and Game's Delta diversion facilities reporting program, and the Tracy Fish Collection Facility staff.

Endangered Species Concerns

There are no endangered or threatened species concerns in the report writing phase.

Dissemination of Results (Deliverables and Outcomes)

A final Tracy Technical Report Series report will be completed in FY 2011.

Literature Cited

- Boutwell, J. and D. Sisneros. 2007. *Water born debris removal evaluations using a traveling screen at the Tracy Fish Collection Facility, Tracy, California*. Tracy Fish Facility Studies, Volume 33, Bureau of Reclamation, Mid-Pacific Region and Denver Technical Service Center.
- White, R., B. Mefford, and C. Liston. 2000. *Evaluation of mitten crab exclusion technology during 1999 at the Tracy Fish Collection Facility, California*. Tracy Fish Facility Studies, Volume 14, Bureau of Reclamation, Mid-Pacific Region and Denver Technical Service Center.